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PATENT SPECIFICATION

744,691



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COMPLETE SPECIFICATION.

Improvements in Bases for Operating Tables and the like.

I, ERNEST GORDON GREVILLE, a British Subject, of 51-53 Park Royal Road, London, N.W.10, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to bases for operating tables or other apparatus which require to be mobile but also need to be firmly set or rendered immobile when in use.

Hitherto mechanical means have been provided for immobilising the table, for example, a lever, cam or screw has been adapted to raise the base off its castors or wheels on to stump feet, or alternatively, to lock the castor wheels.

It has been proposed hitherto to provide a hospital bed having rigid feet and castors with hydraulic means for bringing the castors off the floor so that the bed is firmly supported on its rigid feet, or bringing the castors into contact with the floor so that the bed is raised by them with the feet off the floor. It has also been proposed to provide a hospital bed with castors mounted on hydraulic cylinders fitted with pistons having rods which can be thrust into contact with the floor to raise the bed with the castors slightly off the floor, a single cock controlling the supply of fluid to two cylinders simultaneously.

According to the invention, a wheeled base for an operating table or other apparatus, is provided with stump feet having rams and cylinders for simultaneous hydraulic operation, and is also provided with a ram and cylinder and a pump for hydraulically adjusting the height of the table or apparatus, the pump also supplying fluid to operate the stump feet, a relief valve being provided to ensure that when the pump is first actuated, the stump feet are first operated to immobilise the table, after which, on further operation

of the pump, the pressure fluid is permitted to flow through the relief valve to the table ram, to balance the approximate weight of the table and patient, and to permit of regulation of the height of the table.

Separate release valves are provided, one for the table lift ram and the other for the hydraulic means operating the stump feet, so that the base can be rendered mobile and immobile when required, without interfering with the height adjustment of the table; or the height of the table may be adjusted without rendering the base mobile.

In the accompanying drawings:—

Figure 1 is a plan of an example of base for an operation table or the like according to the invention; 60

Figure 2 being a corresponding side elevation partly in section; 65

Figure 3 is a perspective view with parts broken away; 65

Figure 4 is a sectional elevation of one of the stump feet rams; 70

Figure 5 is a plan of the hydraulic jack for raising and lowering the table or the like; 70

Figures 6 and 7 are sectional elevations on VI—VI and VII—VII, Figure 5; 75

Figure 8 is a plan of the junction box and valve assembly for distributing pressure fluid to and from the stump feet rams; 75

Figure 9 is a sectional elevation on IX—IX, Figure 8; 80

Figure 10 is a side sectional elevation of the relief valve. 80

In the example illustrated by these drawings a base 1 has a number of castor wheels 2 on which it can be wheeled about until it is in a determined position where it is required to be rendered immobile. The base has four hollow bosses 3, Figure 4, each of which is fitted with a ram cylinder 4 the plunger or ram 41, Figure 4, of which extends through a gland 42 and is secured by a nut 43 to a stump foot 5 guided in the



hollow boss 3. Pressure fluid passes into and out of the cylinder 4 through a port or passage 54.

The ram has a return spring 44.

5 The passage 54 of each ram cylinder 4 is connected to a pipe 6 by means of a union 47. All pipes 6 from the stump feet ram cylinders 4 are connected by unions 7 to a junction box or distributing valve casing 8. 10 Each union 7 is fitted in a radial port 9, containing a spring loaded ball check valve 10, Figure 9, leading to a central chamber 11 into which pressure fluid is pumped through an inlet 12 to which the delivery pipe 13 of the pump is connected.

When this occurs all the stump feet cylinders 4 are supplied with pressure fluid simultaneously.

20 A release valve device 14, Figure 9, has a spindle 15 connected to a foot plunger 16 provided with a pad 17 for depression by the operator's foot against the action of a return spring 18.

25 A passage 19 controlled by the valve device 14, Figure 9, leads to a pipe 20 which is connected with a sump 21, Figures 2 and 3.

30 The lower part of the release valve device 14, Figure 9, is conical and when the valve is depressed, to release the pressure fluid, it engages with the check ball valves 10 to open them, and allow pressure fluid from all the stump feet cylinders 4 to be released simultaneously.

35 Each stump foot ram cylinder 4 is provided with a bleeder valve 63, Figure 4, which is normally closed but is opened when required to allow any air present to escape. Each cylinder may be fitted with a protective cap 64 and some of these may be used to support tubular foot rests 65.

40 A pedal operated pump and table lift or height adjusting ram are mounted in the sump 21.

45 The pump comprises a cylinder 22, Figure 6, a piston 23, the rod 24 of which is provided with a crosshead 25 sliding on guide rods 55, Figures 5 and 6. The piston has a return spring 26.

50 The cylinder is secured to a base or casing 27 having an inlet port 28 which is fitted with a woven wire mesh or other strainer 58 and is controlled by a check valve 29. A pump delivery port 30 is fitted with a sleeve 31 forming a seating for a spring loaded check valve 31. Pressure fluid is drawn from the valve 29 into cylinder 22 on the upward stroke of piston 23; upon downward stroke of piston 23 fluid is forced along delivery port 30 through check valve 31 and along passage 32 to pipe 13 which supplies the junction box or valve casing 8.

55 A relief valve is fitted to the pipe 13 to allow pressure fluid to flow to a table lift ram cylinder 67 after the balancing pressure

for securing the stump feet on the floor has been reached when the height of the table has to be regulated. The relief valve shown in Figure 10 is a ball valve 34 normally held to its seating by a plunger 35. A coiled spring 36 abuts at its lower end on a flange 37 on the plunger 35, while its upper end abuts against a second plunger 38.

An adjusting screw 39 at the upper end of the valve casing 40 bears on the plunger 38 and compresses the spring 36. By these means the tension of the spring and therefore the pressure at which the relief valve 34 opens can be regulated.

The screw 39 may be protected by a cap 80 66, Figures 1 and 2.

The arrangement is such that when the pump is operated pressure fluid passes along the pipe 13 and is first supplied to the junction box or valve casing 8 and thence distributed to the stump feet cylinders at sufficient pressure to thrust the stump feet 5 into firm engagement with the floor and to render the base immobile with the castor wheels 2 clear of the floor; and then, when required, further operation of the pump raises the pressure of the pressure fluid sufficiently to open the relief valve 34 to supply the lift ram cylinder 67 with pressure fluid by a pipe 33, Figure 5, to raise the piston 68; and ram 68, and the operation table, to the required height.

The maximum height to which the ram 68 can be raised is determined by ports 46 which allow pressure fluid to escape when uncovered by the piston of the ram 68. The lowest position of the ram is determined by a spring 69 which acts as a buffer and prevents the ram descending below the inlet port 45 to which the pipe 33 is connected.

The lowering of the ram 68 is effected by opening a release valve 49, Figure 7, which is thrust off its seating by a plunger 48 depressed by a plunger 50 against the action of springs 51 and 51¹. Pressure fluid 110 is then allowed to escape from the ram cylinder 67 through an exhaust passage 52 past the open valve 49 and out through exhaust ports 53 into the sump 21.

The pump is operated when required by a pedal 56 which is fixed to a fulcrum pin 57, Figure 3, mounted in a bearing 158, Figure 3, and provided with two rocker arms 59 and 60, Figure 1, having rollers 61 and 62 respectively engaging with the pump cross-head 25 and the upper end of the plunger 50 of the release valve.

When the pedal 56 is depressed the rocker arm 59 depresses the pump piston 23, the spring 26 raising the piston as the operator releases pressure on the pedal.

The pedal lever 56 can be raised so that the rocker arm 60 depresses the plunger 50 and opens the release valve 49 to allow the table lift ram 68 to descend.

130
[REDACTED]

The sump 21 is covered by a dome 70 having a central opening 71 for the table lift ram and the part of the table with which it engages.

5 The base above described can be wheeled about normally on the castor wheels 2 until it is brought into the position in which it is to be rendered immobile. This is effected by operation of the pedal 56 until the stump 10 feet 5 have engaged firmly with the floor.

Further operation of the pedal increases pressure of the pressure fluid to open the relief valve 34 so that the lift ram is operated to raise the table to the required height. 15 Should it be desired to reduce the height of the table the operator raises the pedal 56 thus opening the release valve 49 until the desired adjustment has been effected. This arrangement does not interfere with the 20 stump feet. The stump feet are released to render the base of the table mobile by depressing the plunger 16 which opens the valve device 14 and at the same time opens the four release valves 10 simultaneously, 25 thus releasing the pressure and permitting the springs 44 to return the rams 41 and the stump feet 5 to a position clear of the floor. The base can be immobilised by operation 30 of the pedal 56 without interfering with the height adjustment of the lift ram.

Although all the stump feet rams are operated simultaneously each has a separate supply valve and is capable of automatic adjustment relatively to unevenness of the 35 floor.

What I claim is:—

1. A wheeled base for an operating table or other apparatus is provided with 40 stump feet having rams and cylinders for simultaneous hydraulic operation, and is also provided with a ram and cylinder and a pump for hydraulically adjusting the height of the table or apparatus, the pump also supplying fluid to operate the stump 45 feet, a relief valve being provided to ensure that when the pump is first actuated the stump feet are first operated to immobilise the table, after which, on further operation

of the pump, the pressure fluid is permitted to flow through the relief valve to the table ram, to balance the approximate weight of the table and patient, and to permit of regulation of the height of the table. 50

2. A wheeled base for an operating table or other apparatus according to Claim 1, wherein means are provided for effecting the release of pressure fluid from the table ram cylinder independently of the release of pressure fluid from the hydraulic means operating the stump feet, so that the height adjustment of the table can be effected without interfering with the immobility of the base, and the base can be rendered mobile and immobile without interfering with the height adjustment of the table. 55

3. A wheeled base for an operating table or other apparatus according to Claim 1 or 2, provided with a junction box or valve casing which is connected with all the stump feet hydraulic cylinders and is provided with check valves for holding the fluid in the cylinders while the table is immobilised, the box being provided with a release valve which when opened also opens the check valves to effect simultaneous release of pressure fluid from the cylinders when the table is to be mobile. 60

4. A wheeled base for an operating table or other apparatus, according to Claim 2, 70 3 or 4, wherein the pedal provided for operating the pump is adapted to be used alternatively to operate a release valve connected with the table ram cylinder. 75

5. A wheeled base for an operating table or other apparatus, provided with a hydraulic pump and ram for adjusting the height of the table and with hydraulic means for operating stump feet, constructed and adapted to operate substantially as hereinbefore described with reference to the 80 accompanying drawings. 90

Dated this 12th day of May, 1954.

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52 Chancery Lane, London, W.C.2.

PROVISIONAL SPECIFICATION.

Improvements in Bases for Operating Tables and the like.

1. ERNEST GORDON GREVILLE, a British Subject, of 51-53 Park Royal Road, London, N.W.10, do hereby declare this invention to 95 be described in the following statement:—

The invention relates to bases for supporting operating tables or other apparatus which require to be mobile but also need to be firmly set or rendered immobile when in 100 use.

It is more particularly concerned with bases for operating tables which have

hydraulic means for regulating the height of the table.

Hitherto mechanical means have been 105 provided for immobilising the table, for example, a lever, cam or screw has been adapted to raise the base off its castors on to stump feet, or, alternatively, to lock the castor wheels. 110

According to the invention the base of an operating table, or like support, having castors, or the like, on which the base is

mobile, and stump feet adapted to render it immobile, is provided with hydraulic means for operating the stump feet, these means being preferably adapted to ensure 5 that the stump feet are automatically adjusted to any unevenness of the floor.

When the base is applied to a table having hydraulic means for regulating the height of the table, such as a pump for supplying 10 pressure fluid to a lifting and lowering ram, the same pump may be used for supplying pressure fluid to the rams or plungers of the stump feet; but means are provided to ensure that when the pump is first actuated, the 15 stump feet are first operated to immobilise the table, after which, on further operation of the pump, the pressure fluid is permitted to flow through a relief valve, to balance the approximate weight of the table and patient, to the table ram to regulate its height.

Separate release valves are provided, one 20 for the table lift ram and the other for the stump feet rams, so that the table base can be rendered mobile and immobile when required, without interfering with the height adjustment of the table; or the height of the table may be adjusted without rendering the base mobile.

In an example a base for an operating table is provided with four castor wheels. A hollow boss on the base adjacent to each castor, constitutes a hydraulic cylinder and is fitted with a ram or plunger having a lower enlarged cylindrical portion forming a stump foot for engagement with the floor.

The stump foot cylinders are connected by separate pipes to a junction box or valve casing which is fitted with separate ports and unions for the pipes. Each port is provided with a spring loaded ball check valve. The union connections and valves are preferably arranged radially from the central part of the junction box into which 40 pressure fluid, such as oil, is pumped through an inlet in the casing, to which a supply pipe from a pump is connected, so that all the stump foot cylinders can be supplied simultaneously.

In the casing forming the body of the junction box provision is made for the simultaneous release of the check valves by means of a plunger having a pad or button which is depressed by the operator's foot. 50 This release of the check valves allows the fluid to return to the sump via an additional port which is connected to it.

An additional port is connected by a pipe to a sump.

A pedal operated pump and a table lift ram are arranged in the sump.

The pump comprises an upright cylinder having an open upper end, and a piston, the rod of which extends through the open end and has a cross head. The lower end of the

cylinder is secured to a base or casing having an inlet port for the cylinder from the sump, the port being fitted with a check valve and strainer.

The base also has a delivery port from 70 the cylinder.

A helical spring surrounds the pump cylinder and abuts at one end against the cross head, and at the other end against the base.

The delivery port from the pump leads to a passage in the base in which a spring loaded check valve is fitted.

Near the opposite end of the passage a union for connecting a delivery pipe is provided. This pipe delivers pressure fluid from the pump, through a relief valve to the central inlet in the junction box before referred to. The relief valve is provided with a pipe connected with the table lift ram cylinder. The relief valve is a ball valve normally held to its seating by a plunger. A coiled spring abuts at its lower end on a collar on the plunger, while the upper end abuts against a collar on a second plunger. An adjusting screw at the top of the valve casing bears on the collar of the second plunger and compresses the spring.

By these means the tension of the spring and therefore the pressure at which the relief valve opens can be regulated.

The arrangement is such that when the pump has supplied sufficient pressure fluid to operate the stump feet, a few further strokes of the pump will set up sufficient 100 pressure to open the relief valve and supply fluid to raise the table lift ram.

Independent release of pressure fluid from the table lift ram cylinder is effected by a 105 separate release valve.

The base on which the pump and the cylinder of the table lift ram are mounted is provided with a lateral extension having an exhaust passage for pressure fluid from the table lift ram cylinder.

The escape of fluid from this passage to the sump is controlled by the release valve which is a ball check valve normally held to its seating by a spring.

It is forced off its seating by a small 115 plunger when fluid is to be released.

The plunger is guided in a bore in the lower end of an upright cylinder and extends into this cylinder where it is provided with an enlargement or piston.

Exhaust ports lead from the guide into the sump, the ports being normally closed by the small plunger which is held in position by a coiled spring in the cylinder below the piston.

Another piston or push rod is fitted in the upper part of the cylinder, extends above it and has an enlargement or head. A coiled spring abuts against the head and the upper ends of the cylinder.

When the head is depressed the ball valve is thrust off its seating and fluid is released from the ram cylinder. 20

The pump is operated by a pedal adapted 5 to actuate a rocker having an arm adapted, when the pedal is depressed, to bear on the cross-head of the pump piston rod. It is also conveniently adapted to operate the release valve of the table lift ram cylinder.

10 For this purpose it is lifted so that another arm on the rocker engages with and depresses the head of the plunger or operating rod of the release valve.

As above mentioned, the cylinder of the 15 table lift ram is mounted on the same base as the pump, and is fitted with a ram or piston having a rod extending beyond the upper open end of the cylinder.

A coiled spring below the piston normally holds the piston above the inlet port. The upper end of the rod is secured by suitable means to the table to be raised and lowered.

Safety exhaust ports are provided near to the upper end of the cylinder to limit the maximum upward travel of the piston and lift of the table. 25

Deflectors are provided to deflect escaping fluid downwardly into the sump.

The sump is preferably provided with a domed cover so that the table ram cylinder, the pump and release valve, and the pedal rocker are all enclosed. 30

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5 SHEETS

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SHEET 1

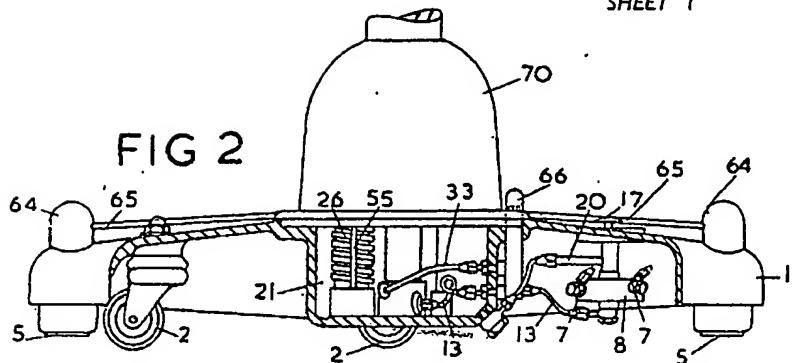


FIG 2

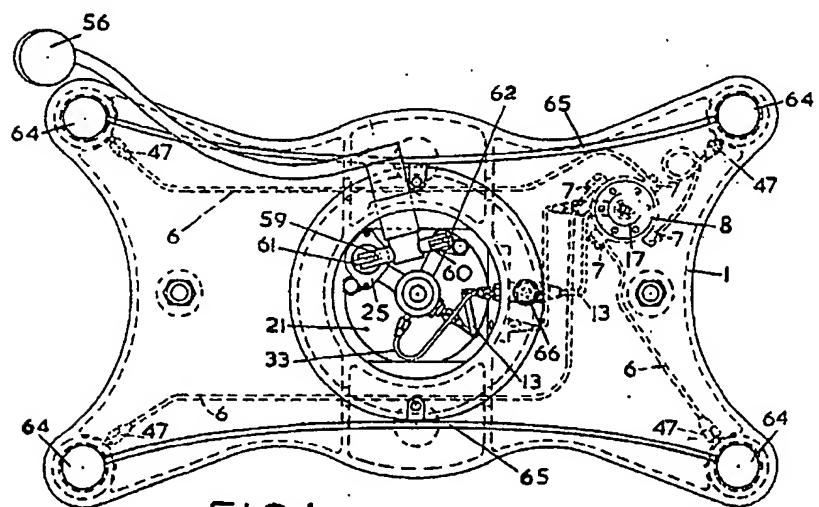


FIG 1

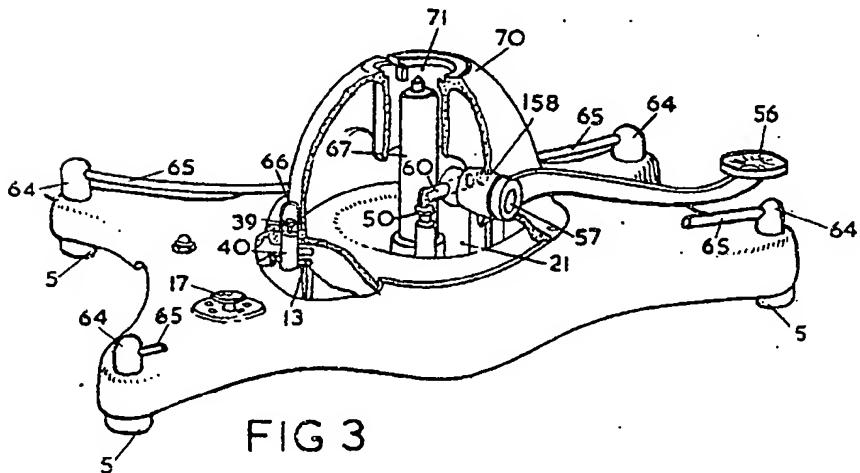


FIG 3

FIG 4

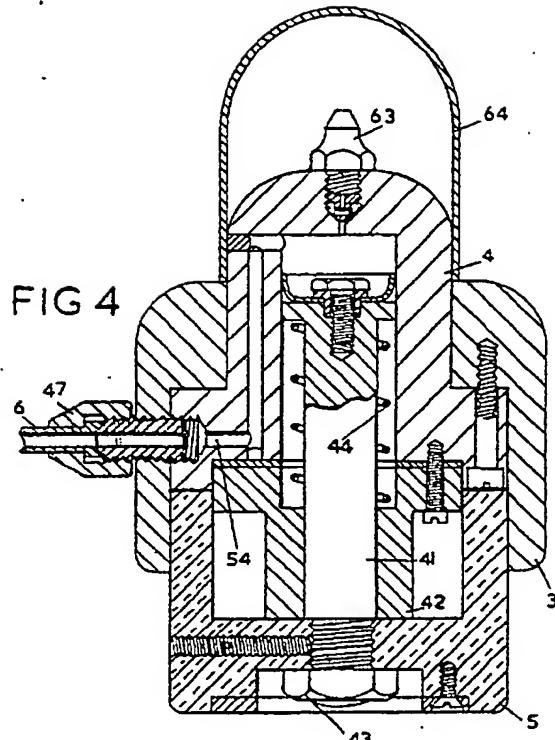
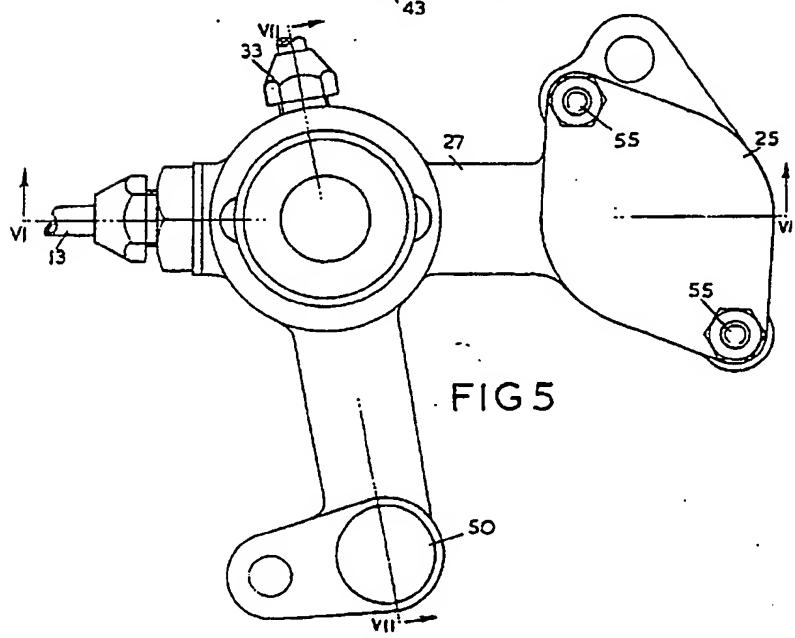


FIG 5



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SHEETS 2 & 5

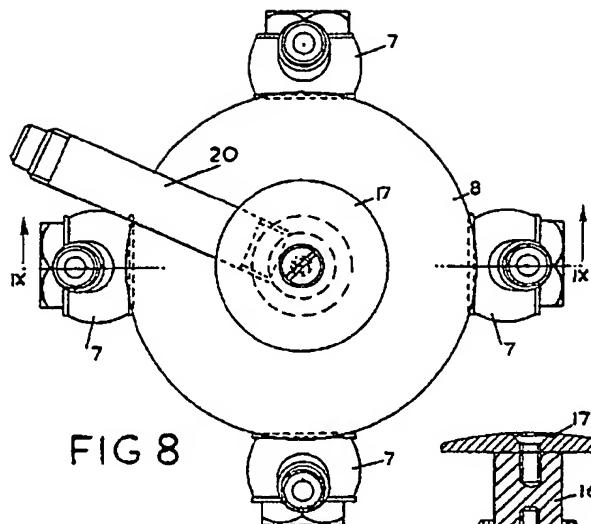


FIG 8

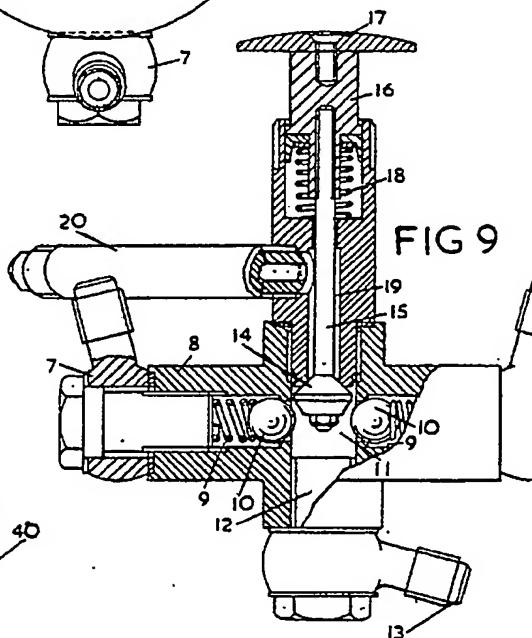


FIG 9

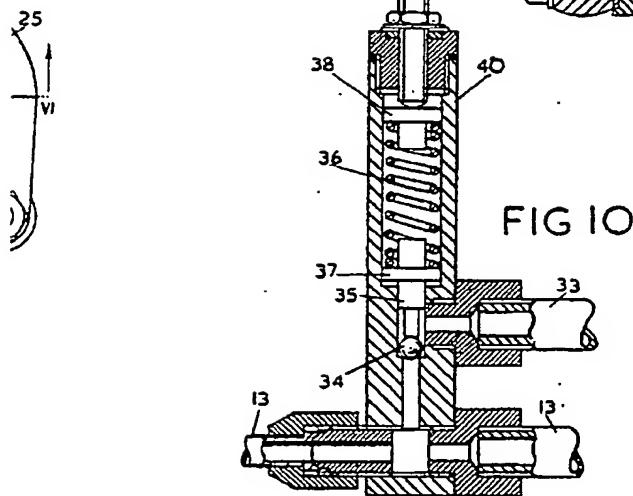
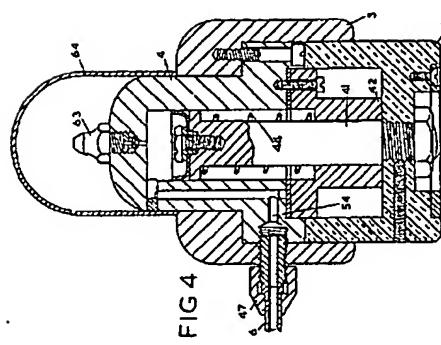


FIG 10

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SHEETS 2 & 5



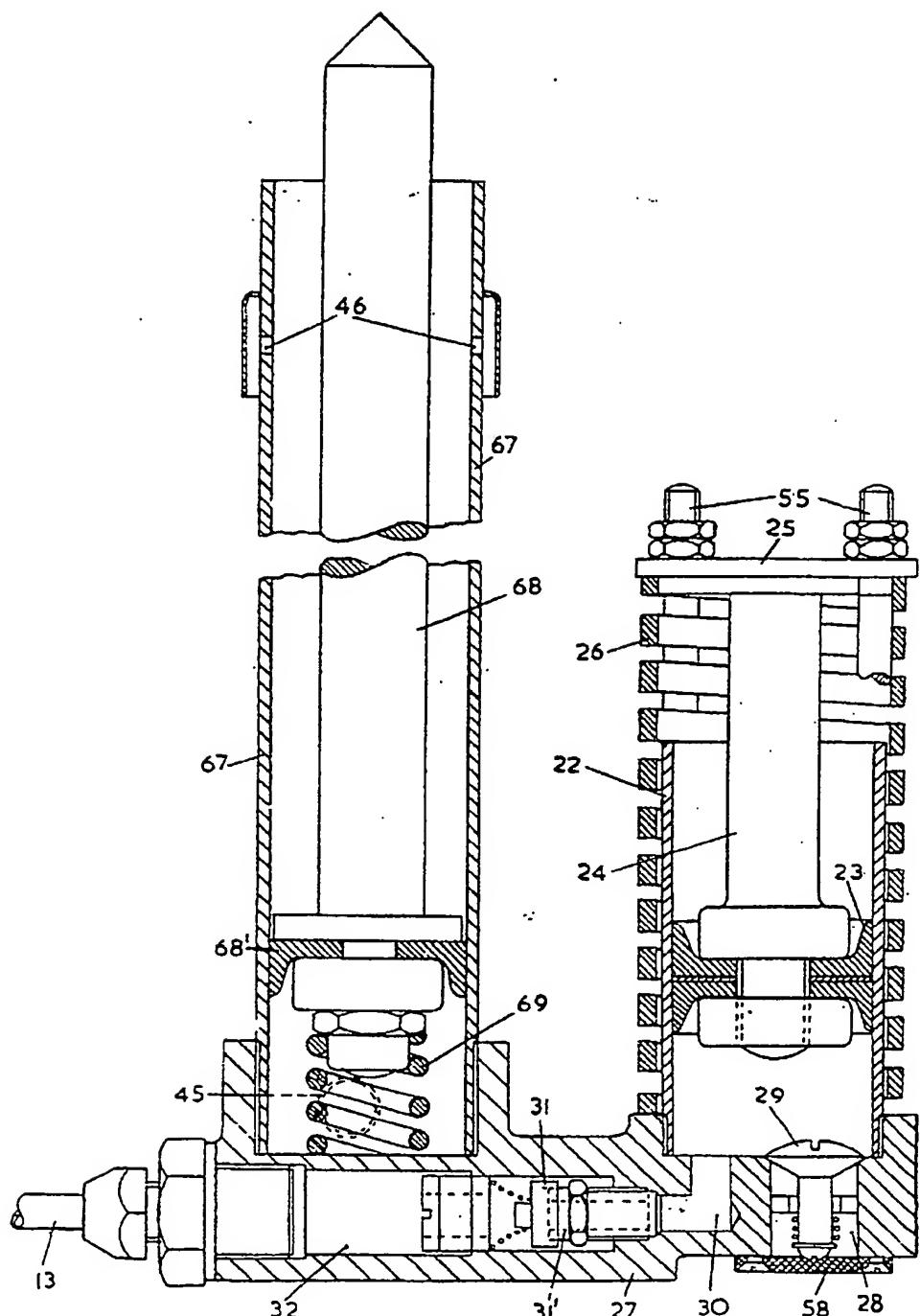


FIG 6

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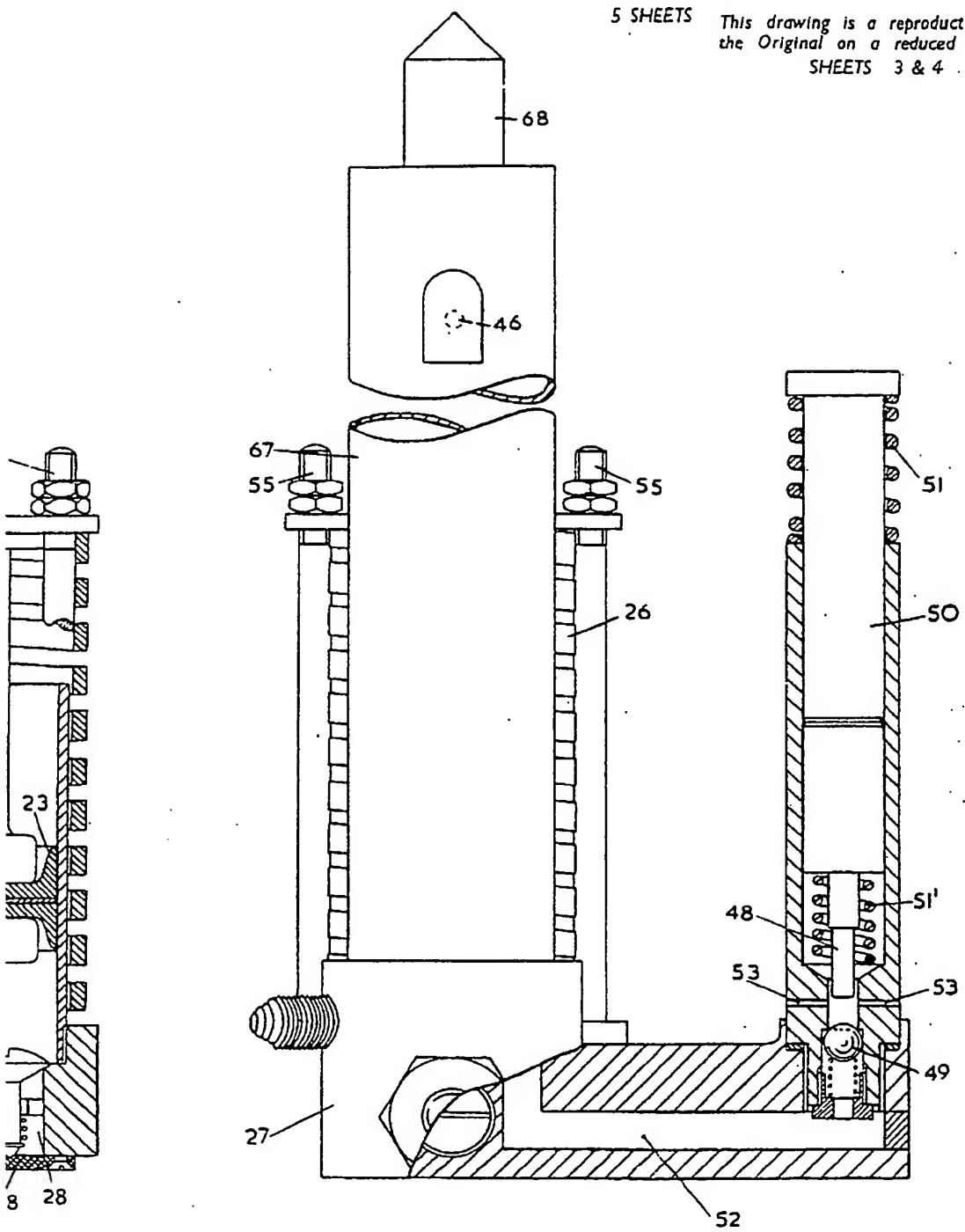


FIG 7

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SHEETS 3 & 4

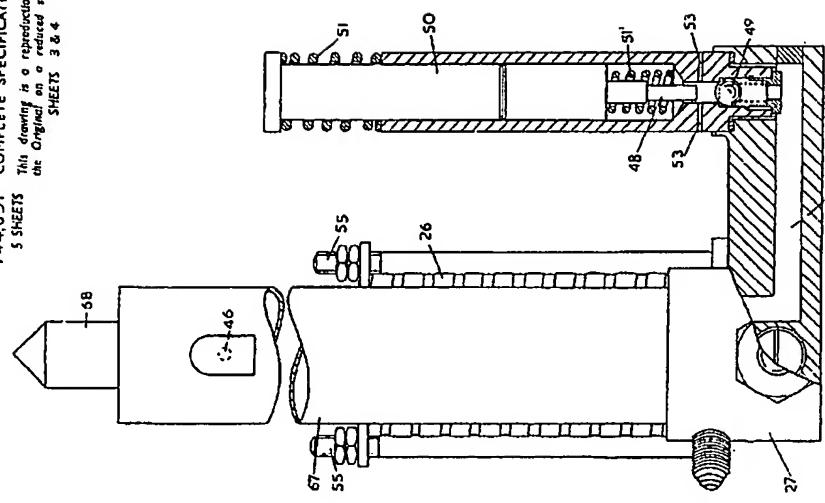


FIG 7

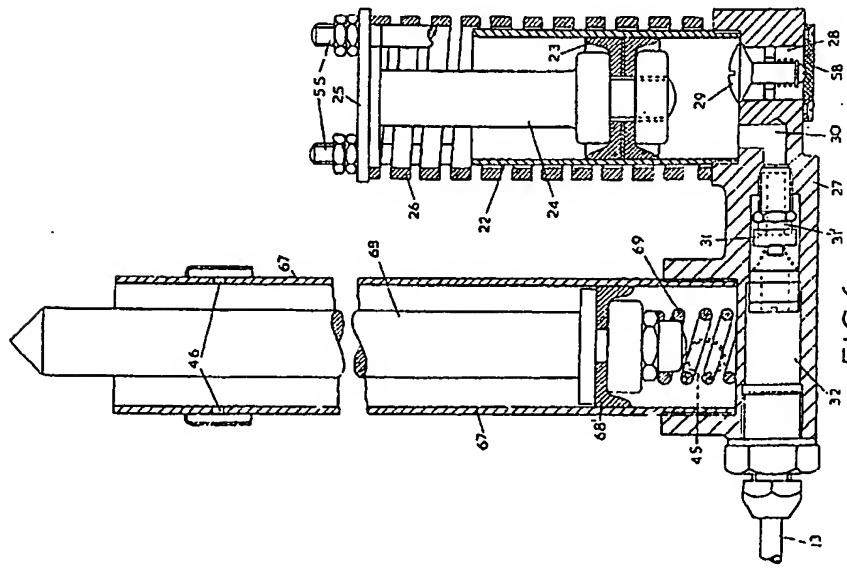


FIG 6

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